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EDITORIAL

rpth research & practice in thrombosis & haemostasis

Attention and citation: Common interests of researchers and journals

Keeping abreast of late-breaking advances is crucial for researchers to contextualize their work. However, researchers often have limited time to search the most relevant and influential findings from the vast, growing literature. Numerous citation-based metrics are available to gauge the scientific merits of a journal (eg, Journal Impact Factor and Eigenfactor), an author (eg, h-index and i10-index), or an article (eg, relative citation ratio). Although these traditional bibliometrics can filter research outputs from noncredible sources, they fall short in accounting for the dissemination of scholarly outputs outside academia in a timely fashion. Altmetrics, an abbreviation for "alternative scholarly impact metrics" and formally referred to as Altmetric Attention Score (AAS), supplements the citation-based metrics and fulfills the unmet need for understanding the volume and nature of the online attention an individual research output has received.

As an article-level metric, AAS is a weighted count of all of the mentions for a scholarly item tracked by Altmetric (https://www.altmetric.com), including public policy documents, mainstream media, Wikipedia, citations, patents, blogs, online reference managers such as Mendeley (https://www.mendeley.com), postpublication peer-review platforms such as PubPeer (https://pubpeer.com) and Publons (https://publons.com), Open Syllabus Project (https://opensyllabus.org), recommended research articles from F1000Prime (https://f1000.com/prime/recommendations), social media such as Facebook and Twitter, and multimedia platforms such as YouTube, Reddit, and Stack Overflow (Table 1).[1,2] The AAS of an article can be accessed from the Altmetric It! Bookmarklet (https://www.altmetric.com/products/free-tools/bookmarklet/) or the Altmetric badge from the publisher website (Figure 1).[3] The full records (eg, content and demographics of shares and mentions, ranking and comparison with other research published around the same time) are provided on the Altmetric details page, which can be accessed by clicking on the Altmetric badge. The Altmetric details page application programming interface is available for accessing comprehensive data for scientometrics research or commercial use (https://api.altmetric.com).

Altmetrics not only informs about the quantitative online impact of a specific research output but also provides qualitative insights into its circulation and the feedback from audiences. For researchers, Altmetrics can be attached to the curriculum vitae for job or grant applications, as the metrics attests to the impact, reach, and engagement around scholarly works, complementing citation-based metrics. This consolidates the evidence for significant contribution to science. On the other hand, Altmetric data can also be analyzed by publishers, institutions, corporations, and funders to assist decision making. In this editorial, we report Altmetric data of the *Research and Practice in Thrombosis and Haemostasis* (RPTH) journal and its association with citations, and discuss how Altmetrics can support strategic planning and advancement of the journal.

We analyzed the AAS and citations (according to Google Scholar and Web of Science) of the 134 articles published in RPTH from 2017 through 2018. The median AAS was 8.7 (interquartile range, 4.5-15.0) and the mean AAS was 12.3 (standard deviation, 14.5). The median AAS was similar across the years (P = .18). The median and mean total citations were 3.0 and 4.6 times from Google Scholar and 2.0 and 2.9 times from Web of Science. The median and mean citations per year were 1.3 and 2.0 times from Google Scholar and 1.0 and 1.3 times from Web of Science. Of note, there was a significant but modest positive correlation between AAS and total citations (R^2, .06; P = .003) or citations per year (R^2, .08; P = .001) from Google Scholar (Figure 2A and B). Correlations were similar between AAS and total citations from Web of Science (Figure 2C and D). This finding is consistent with prior studies and suggests a link between the online attention and citation count of research outputs.[4,5]

At RPTH, aligned with search engine optimization and social media optimization tactics to enhance searchability and visibility of research discoveries,[6,7] Altmetric data are monitored and reviewed on a real-time and regular basis to support the following operations:

1. Benchmark the attention received by published articles and refine content strategies accordingly.
2. Examine audience engagement to ensure that research discoveries are delivered to the target audiences and interpreted properly.
3. Explore trending research topics to inform editorial priorities.
4. Identify key opinion leaders to solicit article submission.

Attention and citation are common interests shared by researchers and journals. We invite researchers to follow @

TABLE 1 Collecting method, update frequency, and weighting of the sources captured by Altmetric[1,2]

Source	Collecting method	Update frequency	Notes	Weight
News	RSS feeds and API	Real-time feed	Manually curated news sources, with data provided via a third-party provider and RSS feeds	8
Blog	RSS feeds	Daily	Manually curated list, harvesting links to scholarly content	5
Policy documents	PDFs collected and scanned from policy sources and repositories	Daily	Scanning and text-mining policy document PDFs for references, which are looked up in CrossRef/PubMed and resolved to DOIs	3
Patent citations	IFI claims	Monthly	Scanning JSON patent records for links to publications and DOIs	3
Wikipedia	Wikipedia API	Real-time feed	Mentions of scholarly outputs collected from References section; English Wikipedia only	3
Twitter	Third party data provider API	Real-time feed	Demographics, support for retweets, with monitoring of suspicious activity	1
PubPeer	PubPeer API	Daily	Peer-review comments collected from item records and associated by unique identifier	1
Publons	Publons API	Daily	Peer-review comments collected from item records and associated by unique identifier	1
Sina Weibo	–	–	Not trackable since 2015 but historical data kept	1
Google+	–	–	Not trackable since 2019 but historical data kept.	1
F1000Prime	F1000 API	Daily	Scan for links to scholarly outputs	1
Open Syllabus Project	Static import from Open Syllabus	Quarterly	Link syllabus's contents to HLOM IDs.	1
LinkedIn	–	–	Not trackable since 2014 but historical data kept	0.5
Facebook	Facebook API	Daily	Posts on public Facebook pages only, with prioritized popular pages	0.25
Reddit	Reddit API	Daily	Includes all sub-reddits; original posts only, no comments	0.25
Pinterest	–	–	Not trackable since 2013 but historical data kept	0.25
Stack Overflow	Stack Overflow API	Daily	Scan for links to scholarly outputs	0.25
YouTube	YouTube API	Daily	Scan for links to scholarly outputs in video comments	0.25
Mendeley	Mendeley API	Daily	Reader counts is number of readers with the output in their library	0
Web of Science	Clarivate Analytics API	Real-time feed	Citation counts from peer-reviewed literature	0

Abbreviations: API, application programming interface; DOI, digital object identifier; HLOM, Harvard Library Open Metadata; IFI, Information for Industry, Inc; JSON, JavaScript Object Notation; PDF, portable document format; RSS, real simple syndication.

RPTHJournal on Twitter (https://twitter.com/RPTHjournal) to watch for what is receiving attention, share the discoveries and viewpoints, and join the discussion with the thrombosis and hemostasis community. Additionally, in view of its supplementary information and association with citation-based metrics, we encourage scholars to leverage Altmetrics data in academic activities such as refining search results, seeking collaboration opportunities, or showcasing research outreach. Finally, we should bear in mind the limitations of Altmetrics. Both Altmetrics and citations could be manipulated or confounded. Just like any other citation-based metric, Altmetrics is only a part of the full picture of scholarly impact. After all, Altmetrics is an "alternative scholarly impact metric" that complements but does not substitute for citations when assessing the totality of scientific merits.

KEYWORDS
bibliometrics, information dissemination, Internet, scholarly communication

FIGURE 1 Example of Altmetric Attention Score displayed on the publisher website

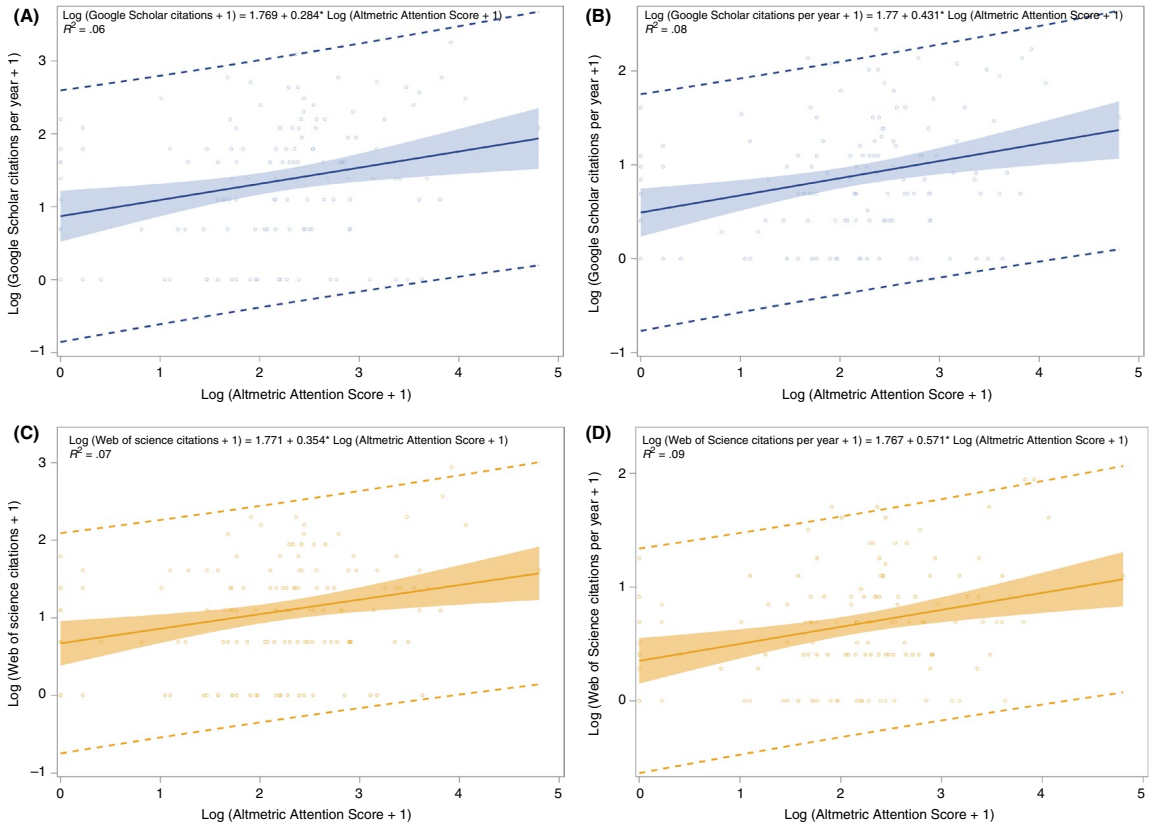

FIGURE 2 Correlation between Altmetric Attention Score and citations from Google Scholar (A and B) or Web of Science (C and D). The shaded area represents the 95% confidence interval for the mean predicted values. Dashed lines represent the confidence limits for the individual predicted values. The solid line represents the best-fitting line

Gerald Chi MD[1]
Mary Cushman MD, MSc[2]

[1]*Division of Cardiovascular Medicine, Department of Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA*
[2]*Department of Medicine, Larner College of Medicine, University of Vermont, Burlington, VT, USA*

Correspondence
Mary Cushman, Larner College of Medicine, 360 South Park Drive, Colchester, VT 05446.
Email: mary.cushman@uvm.edu

ORCID

Gerald Chi https://orcid.org/0000-0002-8371-1689
Mary Cushman https://orcid.org/0000-0002-7871-6143

TWITTER

Gerald Chi @GChiMD
Mary Cushman @MaryCushmanMD

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